WHAT IS CLAIMED IS:

1. A method of forming a cured, dielectric composition on a substrate, comprising the steps of:

(a) coating a composition comprising a thermally curable, dielectric precursor onto at least a portion of the substrate;

(b) causing the coated substrate to be positioned in a process chamber;

(c) while the coated substrate is positioned in the process chamber:

(i) thermally curing the dielectric precursor to form the cured dielectric composition; and

(ii) causing a gas to coolingly contact the cured dielectric composition; and

(d) after said gas coolingly contacts the cured dielectric composition, removing the coated substrate from the process chamber.

2. The method of claim 1, wherein the dielectric precursor comprises an organic prepolymer component, and wherein at least a portion of said thermal curing occurs under anaerobic conditions.

3. The method of claim 1, wherein the dielectric precursor comprises an organic prepolymer component, and wherein at least a portion of said thermal curing and gas cooling occur under anaerobic conditions.

4. The method of claim 3, wherein at least substantially all of the thermal curing and cooling gas contact occur under anaerobic conditions.

5. The method of 2, wherein the anaerobic conditions comprise thermally processing the coated substrate in an anaerobic environment comprising no more than about 200 ppm oxygen.

6. The method of 4, wherein the anaerobic environment comprises no more than about 200 ppm oxygen.

7. The method of claim 1, wherein the dielectric precursor comprises an inorganic prepolymer component, and wherein at least a portion of said thermal curing and gas cooling occur under aerobic conditions.

8. The method of claim 1, wherein a side door operationally engages a portal through which a substrate to be processed is transferred to and from the process chamber.

9. The method of claim 1, wherein the coating step comprises spin coating the composition comprising the curable dielectric precursor onto the substrate.

10. The method of claim 1, wherein said dielectric precursor has a cure temperature, the coated composition comprises a solvent, and thermal curing occurs at a temperature at or above the cure temperature, and wherein the method further comprises the step of, after coating but prior to curing, causing the coated composition to be pre-baked at a temperature below the cure temperature in order to remove at least a portion of the solvent.

11. The method of claim 10, wherein said pre-baking occurs under conditions such that the coated composition comprises an amount of residual solvent.

12. The method of claim 11, wherein said amount of residual solvent comprises from about 0.5 to about 5 weight percent of solvent of the total solvent included in the composition at the time of coating.

13. The method of claim 1, wherein at least a portion of the thermal curing step occurs under vaccuum.

14. A method of forming dielectric compositions on a plurality of substrates, comprising the steps of:

(a) coating a composition comprising a curable dielectric precursor onto a first substrate;

(b) causing the coated substrate to be prebaked, said prebaking being initiated after a first time interval from the end of the coating step;

(c) causing the coated substrate to be thermally cured, said thermal curing being initiated after a second time interval from the end of the pre-baking step;

(d) causing the thermally cured substrate to be cooled, said cooling being initiated after a third time interval from the end of the thermal curing step; and

(e) repeating steps (a) through (d) for at least one additional substrate, wherein the respective second time intervals for each of the first coated substrate and the at least one additional coated substrate are substantially the same.

15. The method of claim 14, wherein the respective first time intervals for each of the first coated substrate and the at least one additional coated substrate are substantially the same.

16. The method of claim 14, wherein the respective third time intervals for each of the first coated substrate and the at least one additional coated substrate are substantially the same.

17. The method of claim 16, wherein the respective first time intervals for each of the first coated substrate and the at least one additional coated substrate are substantially the same.

18. The method of claim 14 wherein at least a portion of the cooling occurs by causing a gas to coolingly contact the thermally cured substrate, and wherein the thermal curing and said cooling gas contact occur in the same process chamber.

19. The method of claim 14, wherein the dielectric precursor comprises an organic prepolymer component, and wherein at least a portion of said thermal curing occurs under anaerobic conditions.

20. The method of claim 15, wherein the dielectric precursor comprises an organic prepolymer component and wherein at least a portion of said thermal curing and said cooling gas contact occur under anaerobic conditions.

21. The method of claim 18, wherein at least substantially all of the thermal curing and cooling gas contact occur under anaerobic conditions.

22. The method of claim 14, wherein at least a portion of the thermal curing step occurs under vaccuum.

23. A method of forming a cured, dielectric composition on a substrate, comprising the steps of:

(a) coating a composition comprising a thermally curable, dielectric precursor and an amount of solvent such that the composition has a coatable viscosity onto at least a portion of the substrate;

(b) pre-baking the coated substrate at a first, relatively low temperature profile under conditions such that at least a portion of the coated dielectric precursor is uncured and the coated composition comprises a residual amount of solvent;

(c) thermally curing the dielectric precursor at a second, relatively high temperature profile under conditions such that at least substantially all of the dielectric precursor is cured to form the dielectric composition; and

(d) cooling the cured dielectric composition.

24. A method of forming a cured, dielectric composition on a substrate, comprising the steps of:

(a) coating a composition comprising a thermally curable, dielectric precursor onto at least a portion of the substrate;

(b) causing the coated substrate to be positioned in a process chamber;

(c) while the coated substrate is positioned in the process chamber:

(i) thermally curing the dielectric precursor to form the cured dielectric composition, wherein at least a portion of the thermal curing occurs under anaerobic conditions; and

(ii) causing a gas to coolingly contact the cured dielectric composition; and

(d) after said gas coolingly contacts the cured dielectric composition, removing the coated substrate from the process chamber.

25. A method of forming respective dielectric compositions on a plurality of substrates, comprising the steps of:

(a) causing a first composition comprising a first dielectric precursor to be coated onto a first substrate;

(b) causing the coated, first substrate to be positioned in a processing chamber;

(c) while the first substrate is positioned in the processing chamber:

(i) causing the first substrate to be in thermal contact with a heat source under conditions effective to thermally cure the first, coated substrate; and

(ii) causing a gas to coolingly contact the thermally cured, first substrate; and

(d) repeating steps (a) through (c) for a second substrate.

26. The method of claim 25, wherein at least a portion of at least one of the repeated steps (a) through (c) occurs while at least a portion of at least one of said steps (a) through (c) is carried out with respect to the first substrate.

27. The method of claim 25, wherein said coating, positioning, thermal curing, and cooling steps are carried out in a cluster tool comprising at least one input/output module, at least one coating module, and at least one combination cure/cool module.

28. The method of claim 27, wherein the tool comprises at least two cure/cool modules and at least a portion of the curing step for the first substrate occurs while at least a portion of the curing step for the second substrate is occurring.

29. The method of claim 27, wherein the tool comprises at least two cure/cool modules and at least a portion of the gas cooling step for the first substrate occurs while at least a portion of the gas cooling step for the second substrate is occurring.

30. The method of claim 27, wherein the tool comprises at least two cure/cool modules and at least a portion of the gas cooling step for the first substrate occurs while at least a portion of the gas cooling step for the second substrate is occurring.

31. The method of claim 25, wherein each of the first and second substrates are processed in parallel according to first and second process recipes, respectively, said first and second process recipes being different.

32. The method of claim 29, wherein each of the first and second substrates are processed in parallel according to first and second process recipes, respectively, said first and second process recipes being substantially identical.

33. The method of claim 25, further comprising subjecting each of the first and second coated substrates to respective pre-bake treatments, said pre-bake treatments occurring prior to thermal curing.

34. The method of claim 33, wherein thermal curing of the first coated substrate is initiated after a first time interval from the end of the corresponding pre-bake treatment and thermal curing of the second coated substrate is initiated after a second time interval from the corresponding pre-bake treatment, said first and second time intervals being substantially identical.

35. The method of claim 34, wherein each of the first and second substrates are processed sequentially according to first and second recipes, respectively, said first and second recipes being substantially identical.

36. The method of claim 34, wherein each of the first and second substrates are processed sequentially according to first and second recipes, respectively, said first and second recipes being different from each other.

37. A method of forming respective dielectric compositions on a plurality of substrates, comprising the steps of:

(a) providing first and second groups of substrates, each of said groups comprising at least one substrate to be processed;

(b) in accordance with a first process recipe:

(i) causing a first composition comprising a first dielectric precursor to be coated onto each substrate in the first substrate group;

(ii) causing each of the coated, substrates of the first group to be positioned in a processing chamber;

(iii) while each of the substrates of the first group is positioned in the processing chamber: causing each such coated substrate of the first group to be in thermal contact with a heat source under conditions effective to thermally cure such coated substrate; and causing a gas to coolingly contact each of the thermally cured, first substrates; and

(c) in accordance with a second process recipe different than the first process recipe, repeating step (b) for each of the substrates in the second group.

38. An apparatus for thermally processing a microelectronic device precursor, comprising:

a process chamber in which the precursor is positioned during processing;

a heat source thermally coupled to the process chamber in a manner such that the precursor may be heated during processing;

a source of a cooling gas in fluid communication with the process chamber such that the cooling gas may be caused to coolingly contact the precursor during processing; and

a control system that controls the heat source and source of cooling gas in order to subject the precursor to a desired thermal processing profile involving at least one heating step and at least one cooling step during processing.

39. The apparatus of claim 38, further comprising a transport mechanism operationally coupled to the precursor positioned in the process chamber in a manner effective to transport the precursor through a range of motion comprising a precursor heating position and a precursor cooling position.

40. The apparatus of claim 38, further comprising a portal positioned on the side of the apparatus through which the precursor is loaded into and withdrawn from the process chamber.

41. The apparatus of claim 38, wherein said heat source comprises a bake plate positioned in the process chamber and wherein the apparatus further comprises a hollow support member upon which the bakeplate is supported at least in part.

42. A cluster tool, comprising at least one combination heat/cool process station comprising:

a process chamber in which the precursor is positioned during processing;

a heat source thermally coupled to the process chamber in a manner such that the precursor may be heated during processing; and

a source of a cooling gas in fluid communication with the process chamber such that the cooling gas may be caused to coolingly contact the precursor during processing.

43. The cluster tool of claim 42, further comprising an input/output station, a coating station, a pre-bake station, and a robot comprising an operational range of motion that allows the robot to operationally load and unload a workpiece from each of the stations.

44. The cluster tool of claim 43, further comprising at one additional heat/cool process station.

45. The cluster tool of claim 44, wherein the additional heat/cool process station is positioned vertically above the other heat/cool process station.

46. The cluster tool of claim 43, further comprising a central source of at least one utility, said utility source being independently coupled to the combination heat/cool stations.

47. The cluster tool of claim 44, further comprising at least one pre-bake station.

48. The cluster tool of claim 42, further comprising a dispense station that is operationally coupled to a source of a coatable composition comprising a dielectric precursor in a manner effective to allow an amount of the coatable composition to be coated onto a substrate.